





PiB5 #1 2250e

**GUIDELINE F-8**  
**(formerly 08-04)**

**Provision and Operation of Phosphorus Removal  
Facilities at Municipal, Institutional and  
Private Sewage Treatment Works**

**Legislative Authority:**

*Ontario Water Resources Act, Section 53*  
*Ontario Water Resources Act, Section 60*

**Responsible Director:**

Director, Program Development Branch

**Last Revision Date:**

April, 1994

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## **SYNOPSIS**

The primary purpose of this guideline is to ensure that phosphorus removal facilities are installed and properly operated at municipal, institutional and private sewage treatment works, to minimize water quality problems and associated eutrophication problems caused by excessive phosphorus levels in receiving water bodies.

This guideline is supported by Guideline F-10: "Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)" and Procedure F-8-1: "Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works".

### **1.0 Introduction**

The primary purpose of this guideline is to ensure that phosphorus removal facilities are installed and properly operated at municipal, institutional and private sewage treatment works. Phosphorus removal is designed to protect receiving water quality and minimize associated eutrophication problems. An oversupply of nutrients, especially phosphorus and nitrogen, can cause algal blooms that clog waterways and strip the water of oxygen. Eutrophication can kill fish, impair the recreational value of a water body and raise the cost of drinking water treatment.

Phosphorus limits on sewage treatment plant discharges are gauged to the attenuating capacity of the receiving water body. This guideline addresses phosphorus discharges to, specifically, the basins of Lakes Erie, Superior, Huron and Ontario, the St. Lawrence and Ottawa Rivers, and recreational waterways. In addition, more stringent requirements may be assessed on a case-by-case basis.

Any deviation or relaxation from this guideline must receive the concurrence of the Director, Program Development Branch.

### **2.0 Compliance Assessment**

Except for seasonal and annual discharging lagoons, compliance with effluent phosphorus requirements for all other sewage works shall be assessed using a monthly arithmetic mean concentration calculated for each month of discharge.

For seasonal and annual discharging lagoons, compliance with the effluent phosphorus requirements shall be assessed using an arithmetic mean concentration calculated for each discharge period.

The minimum sampling frequencies for treatment works are described in Procedure F-8-1:

"Determination of Phosphorus Removal Requirements for Municipal, Institutional, and Private Sewage Treatment Works".

At sewage works where samples are collected more frequently than the minimum requirement, all samples must be included in the calculation of the mean concentrations.

In the case of conflict between the requirements specified in this guideline and those of Guideline F-10: "Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)" and Guideline F-5: "Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters", and their associated procedures, the requirements of this guideline shall take precedence.

### **3.0 Basin Requirements**

#### **3.1 Lake Erie**

All municipal and institutional sewage treatment works discharging into the Lake Erie Basin, regardless of nominal design capacity, shall have effluents not exceeding a total phosphorus concentration of 1.0 mg/l.

#### **3.2 Lake Superior, Lake Huron, Lake Ontario, St.Lawrence and Ottawa River basins**

All municipal and institutional sewage treatment works, having nominal design capacities of 4,546 cubic metres per day, or more, discharging into the Lake Superior basin, Lake Huron basin, Lake Ontario basin, St. Lawrence River basin, or Ottawa River basin shall have effluents not exceeding a total phosphorus concentration of 1.0 mg/l.

### **4.0 Recreational Waterways**

All municipal and institutional sewage treatment works, regardless of capacity, discharging to recreational waterways, such as, but not restricted to, the Trent-Severn River system (including the Lake Simcoe drainage basin and the Bay of Quinte drainage basin), the Rideau River system, the Lake Nipissing drainage basin, and selected areas of the Lake Huron (Georgian Bay) drainage basin shall have effluents not exceeding a total phosphorus concentration of 1.0 mg/l.

### **5.0 More Stringent Requirements**

Phosphorus removal requirements more stringent, (either in terms of effluent concentration/loading, or design hydraulic capacity to which they apply), than those outlined in Sections 2 and 3 above, may be imposed, but only when justified by appropriate site-specific receiving water assessments or basin-wide considerations.

At treatment facilities which have a more stringent seasonal requirement, such as an effluent total phosphorus concentration of 0.5 mg/l in the period May to September inclusive, the lower concentration requirement may be assessed as the mean for the season. The requirement of a

monthly mean concentration of 1.0 mg/l must still be achieved both during and outside this seasonal period.

## **6.0 Phosphorus Removal Based on Water Assessment Studies**

Phosphorus removal requirements for municipal and institutional sewage treatment works discharging to water not included in Sections 2 to 4, and for private communal sewage treatment works, shall be determined through receiving water assessments, as the need arises.

## **7.0 Sample Collection and Analysis for Effluent Phosphorus Determination**

Sample collection and analytical procedures to assess effluent compliance shall be in accordance with Guideline F-10: "Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)".

## **8.0 Procedure F-8-1**

For assistance in implementing this guideline, reference should be made to Procedure F-8-1: "Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works".





